

FOLDABLE CUP**Field of the Invention**

The invention relates to containers made from a one-piece flat sheet, made of for instance, waterproof material so that the containers may be used to hold both liquids and solids. In particular the invention relates to containers made from a one-piece flat sheet having an integral handle.

Background to the Invention

Foldable containers are known for use as vessels such as cups for holding drinks or foods for personal consumption. Such foldable containers are either simple in structure in which case they will not retain their folded condition without hand or finger pressure being applied to them, or they are relatively complex structures including clamps or other devices for attaching to the folded container body in order to maintain its folded condition.

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Furthermore, such containers are rarely provided with a handle to facilitate the handling of the container whilst it contains hot food or drinks. In the case where a handle is provided, it is a separate piece that requires attachment to the container body.

20 There is a need for a simple foldable container having an integral foldable handle, which may be maintained in its folded condition without using a separate fastening or other element which add to the overall complexity and cost of the article.

Statement of Invention

According to the present invention there is provided a foldable cup comprising a sheet of material having a container piece integral with at least one handle piece, said container piece having fold lines enabling it to be transformed from a flat condition into a folded
5 container, and said handle piece having fold lines enabling the handle piece to be formed into a handle extending from and held in position relative to the container.

In a preferred embodiment the cup comprises one integral handle piece. In an alternative embodiment the cup comprises two integral handle pieces.

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Preferably the handle comprises fold lines that define a central gripping section. More preferably, the handle is formed by folding the handle piece about said fold lines thereon and then retaining the formed handle to the container by the folding interaction of the formed handle and container. Alternatively the handle is formed by folding the handle
15 piece about said fold lines thereon and then retaining the formed handle to the formed container by the use of integral fastening means.

In a preferred embodiment said folded container is formed by folding the container piece about fold lines thereon. Preferably said container piece fold lines define at least two
20 corner pieces. More preferably said at least two corner pieces are folded across one another and secured by an integral fastening means.

Preferably, the integral fastening means are mating connection elements, more preferably press-stud fastenings. In an alternative embodiment said integral fastening means is said formed handle.

- 5 In a preferred embodiment said container piece fold lines define at least face, over which said at least two corner pieces can be folded and fastened. Preferably the container piece fold lines define a self-supporting base.

- 10 In a preferred embodiment, the container piece comprises a sheet of material substantially dodecagonal in shape. Preferably said sheet of material is a waterproof material. More preferably, the material is a plastics material, for example polypropylene. Preferably, the material is sufficiently flexible that it may be readily folded about fold lines scored into it.

15 **Brief Description of the Drawings**

The invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows a plan view of the cup having a container portion and a handle portion, in its unfolded flat condition;

- 20 Figure 2 shows the container portion of figure 1 being assembled by a user;

Figure 3 shows the handle portion of figure 1 being assembled by a user;

Figure 4 shows the cup of figure 1 in a folded formation;

Figure 5 shows a plan view of the cup in accordance with a second aspect of the present invention in its unfolded flat condition; and

Figure 6 shows a plan view of the cup in accordance with a second aspect of the present invention in its unfolded flat condition, the cup having a container portion and
5 two handle portions.

Detailed Description of the Invention

Referring to figure 1 of the accompanying drawings, a foldable cup is illustrated in its unfolded flat condition. The cup comprises a sheet of material 1, said sheet further
10 comprising a container piece 2 and a handle piece 3. The sheet 1 is provided with a plurality of fold lines which have been scored into the body of the sheet.

The container piece 2 is dodecagonal in shape. By "dodecagonal" is meant that the shape is a twelve-sided figure having the general shape shown in figure 1, rather than the shape
15 of a regular dodecagon. In an alternative embodiment, the shape could be hexagonal or any other suitable shape. The container piece 2 is provided with inner fold lines 5, which define a self-supporting base 6. In the present embodiment, the self-supporting base 6 is rectangular in shape, comprising two long fold lines 5' and two short fold lines 5''.

Alternatively the self-supporting base 6 is any other suitable shape. By "self-supporting",
20 is meant that, when the cup is in its folded condition, the base 6 allows the cup to stand upright without the need for external support.

A fold line 7 extends from each corner of the self-supporting base 6. Each fold line 7 extends to a corner of one of two sides of the dodecagon which are each parallel to one of two opposing fold lines 5 of the self supporting base 6. In the present embodiment said two opposing fold lines 5 are the two shortest fold lines 5'' of the rectangular self supporting base 6. Fold lines 7 also define the two faces of the cup, 8 and 9.

A second fold line 10 extends from each corner of the rectangle 6. Each second fold line 10 extends to a corner that is itself adjacent to one of the corners joined by a fold line 7 (the corner joined by fold line 10 being one which itself is not joined by a fold line 7). The fold lines 10 and 7 define a corner piece 11. In the present embodiment there are provided four corner pieces, each generally triangular in shape. The fold lines 10 also define two side pieces, 14 and 15.

The face 8 is provided with a press stud 12. The two corner pieces 11 and 11' adjacent to the face 8 are each provided with hole 13' and 13'' respectively, positioned such that when folded across the front of the face 8 each hole accommodates the press-stud 12. The side piece 14 is provided with a hole 13 positioned such that when the corner piece 11, (which is adjacent to both the face 8 and the side piece 14) is folded, using fold lines 7 and 10, towards the face 8, the hole 13 is aligned with and can accommodate the press stud 12. The side piece 15 is provided with a press stud mating part 16. The press stud mating part 16 is positioned such that, when the corner piece 11', is folded using the fold lines 7 and 10 towards the face 8, the three holes 13, 13' and 13'' are aligned with and

can accommodate the press stud mating part, such that it can meet and be snapped together with the press stud 12.

The handle piece 3 is integral with the edge of the dodecagon which defines the edge of the face piece 9. The handle piece extends from the two corners 23 and 24, that define said edge. The handle piece 3, is provided with three fold lines 17, 17' and 17'' which traverse the width thereof. The fold lines 17, 17' and 17'' divide the handle 3 into four sections: an upper handle piece 18, a central gripping section 19, a lower handle piece 20 and a tongue 21.

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A spine 26 is located in the central gripping section 19. In the present embodiment the spine 26 is rectangular in shape. Alternatively the spine could be any other suitable shape. The spine 26 is defined by two parallel fold lines 27. The two lines 27 form the two longest sides of the rectangular spine 26, and each extend longitudinally from the fold line 17 to the fold line 17'. A gripping surface 31 is disposed on either side of the spine 26. The upper handle piece 18 is provided with two fold lines 22 which extend from the corners 23 and 24 to the fold line 17. Adjacent to each fold line 22 is an edge piece 32. The fold lines 22 connect the fold line 17 to form an upper short edge 25 of the spine 26. Two further fold lines 28 define the lower short edge 29 of the spine 26. The two fold lines 28 extend from the two corners of the lower short edge 29 of the spine 26 across the lower handle piece 20 and extend to the two ends of the fold line 17''. Adjacent to each fold line 28 is an edge piece 33. The edge pieces 32 and 33, along with the gripping surface 31 form a side panel 34.

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A tongue 21 is located below the fold line 17''. The tongue has curved edges 30 at the end thereof. The width of the tongue 21 is not greater than the than the shortest side of the self supporting base 6. In an alternative embodiment the width of the tongue bows
5 outwards towards the center thereof, the width of the bottom leading edge of the tongue not exceeding the shortest side of the self supporting base 6.

Figure 2 illustrates the container piece 2 being folded to form a container. The two corner pieces 11 and 11'' adjacent to the face 8 are folded towards the exterior of face 8. The
10 corner piece 11 adjacent to the side piece 14 is folded towards the face 8 first. In folding the corner piece 11 towards the face 8, the side piece 14 is curved towards the face 8 and the holes 13 and 13' of the corner piece 11 and the side piece 14 respectively, align such that the press stud 12 on the exterior of the face 8 is exposed therethrough. The corner piece 11' is then folded across the face 8, overlapping part of the corner piece 11. The
15 hole 13'' is aligned with the holes 13 and 13' and exposes the press stud 12 therethrough. In folding the corner piece 11' across the face 8, the side piece 15 is curved across the face 8, the mating press stud part provided on the top side of the side piece 15 aligning with the holes 13, 13' and 13'' such that the press stud parts 12 and 16 meet and can be snapped together, causing the front face 8 and two side faces 14 and 15 to extend
20 upwards from the fold lines 5 of the self supporting base 6.

Figure 3 illustrates the handle piece being folded to provide a leak proof container having a handle capable of supporting the container when the container is filled with food or

beverage. The corner pieces 11'' and 11''' are folded one over the other across the exterior of the face 9. This creates a leak proof container. The corner pieces 11'' and 11''' are retained in their folded condition by the folding interaction of the handle piece 3 and the container piece 2. In this embodiment, the folding interaction is as follows.

- 5 Starting with the handle in its unfolded condition, the handle piece 3 is folded over the corner pieces 11'' and 11''', so that the tongue 21 of the handle piece 3 can be inserted between the folded over corner pieces 11'' and 11''' and the face 9. At this stage the unfolded handle 3, is looped back on itself so that the tongue 21 completes a loop starting and finishing at the top edge of the face 9. The tongue is retained between the top edge of
- 10 the face 9 and the fold line 5'' by the upper handle piece 18, the central gripping section 19 and the lower handle piece 20 interacting with the outer surfaces of corner pieces 11'' and 11''' in position folded across face 9.

- The application of an inward pinching action by the user to the gripping surfaces 31
- 15 enables the three dimensional handle-shape to be formed by causing folding of the handle about the fold lines thereon. The inward pinching action displaces the edge pieces 32 and 33, so that the gripping surfaces 31 oppose one another and the spine 26 and gripping surfaces 31 create a three dimensional vertical support for the handle. While the handle is in its unfolded condition, the peripheral edge length of the side panels 34 is greater than
- 20 the vertical distance between the top edge of the face 9 and the edge 5''. The pinching action makes the side panels 34 deform causing a reduction in the peripheral edge length of side panels 34. This reduction in length forces the tongue 21 further between the face 9 and the corner pieces 11'' and 11'''. The side panels 34 apply a direct pressure upon the

corner pieces 11'' and 11''' because they are in contact therewith. In turn the corner pieces 11'' and 11''' apply extra force against the tongue 21, securing it in its folded position against the face 9. The reduction in length of the side panels 34 causes the three dimensional structure of the handle 3 to be retained, even upon the removal of the
5 pinching force by the user. Retaining of the handle in position is assisted by outward forces exerted thereon by the folded corner piece 11'' and 11''' (which are trying to spring outwardly). The opposite inward forces of the handle on the corner pieces 11'' and 11''' assist in retaining the tongue 21 against the face 9.

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In an alternative embodiment the face 9 and tongue 21 are provided with mating connection elements, for example press-stud fastenings in order to retain the tongue 21 against the face 9 in its folded position.

15 In its folded condition the handle 3 is secured both vertically and horizontally in the plane of the face 9, thus improving its rigidity. The handle 3 extends along the height between the edge of the face 9 and fold line 5''. The forces applied by the corner pieces 11'' and 11''' against the tongue 21 secure the tongue 21 and thus the handle both vertically and horizontally in the plane of the face 9. The handle is thus rigidly secured with respect to
20 the container.

The handle of the invention provides easier handling and holding of the container. The three dimensional folded handle 3 can easily be grasped by a user applying finger

pressure to the gripping surfaces 31. As the handle is secured both vertically and horizontally in the plane of face 9, the handle 3 can be securely gripped without fear of spilling the contents of the container. A secure handle is necessary in order to prevent spillage of the contents, particularly when the container is used for carrying hot substances such as tea and coffee. Lack of a secure handle on such a container provokes a number of safety implications, particularly as carrying the container using an unsecured handle may lead to scalding.

The handle 3 is integral with the container 2, however, in the folded condition, the handle 3 is not in communication with the interior of the container, as illustrated in figure 4. This provides the advantage that when in use the handle does not contact the contents of the container. This is of particular importance when the container is carrying hot substances. Furthermore, the corner pieces 11'' and 11''' when in position folded across the face 9 provide insulation between the container and the handle thereby reducing conduction of heat into the handle.

Figure 5 illustrates an alternative embodiment in which the fold lines 7' and 7'' each extend to a corner of one of the two sides of the dodecagon which are each parallel to one of the two longest opposing fold lines 5 of the rectangular self supporting surface 6. This forms a front piece 41. The front piece 41 is provided with press studs 42. The fold lines 10', 10'' and 7', 7'' act to define corner pieces 44.

Each side piece 14 and 15 is provided with a press stud mating part 40. Each corner piece 44 is provided with a hole 43 positioned such that when folded across the front of the adjacent side piece 14 or 15, as the case may be, each hole 43 accommodates the a press-stud 42. Each press stud mating part 40 is positioned such that, when a corner piece 44, is
5 folded using the fold lines 7 and 10 towards one of the side pieces 14 or 15, the hole 43 is aligned with and can accommodate the press stud mating part 40 and the press stud 42, allowing the press stud 42 and mating part 40 to meet and be snapped together.

Figure 6 illustrates a further embodiment in which the container piece 2 is provided with
10 a second handle piece 3' integral with the edge of the dodecagon which defines the edge of the face piece 8. The corner pieces 11 and 11' are folded towards the face 8 and retained in a folded position by the interaction of the folded handle 3', the face 8 and the folded corner pieces 11 and 11'. This provides a two-handled container which removes the need for fastening elements, the exclusion of which may add to the manufacturing
15 expense. In the present embodiment the cup can be manufactured from only a single sheet of material.